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Ames

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(54) **FIBER OPTIC PITCH OR ROLL SENSOR**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

6,218,661 B1 * 4/2001 Schroeder et al. 250/227.14

* cited by examiner

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(57) **ABSTRACT**

The present invention relates to a fiber optic sensing device having utility as a roll sensor and/or a pitch sensor. The sensing device comprises at least one optical fiber supported in a structure, a movable mass supported within the structure, and at least one detector for detecting changes in tension in the at least one optical fiber due to movement of the movable mass. In the sensor of the present invention, the optical fiber(s) are the only deformable structures, thus maximizing sensitivity.

8 Claims, 2 Drawing Sheets